

Genotoxicity and Cytotoxicity of the Bark Aqueous Extract of *Ochna Schweinfurthiana* f. Hoffm

Djova SV^{1,4}, Afagnigni DA², and Nyegue MA³

¹Department of Biochemistry, University of Bamenda, P.O. Box 39 Bambili, NW Region-Cameroon

²Department of Biochemistry, University of Yaoundé I, P.O. Box 812 Yaoundé, Cameroon

³Department of Microbiology, University of Yaoundé I, P.O. Box 812 Yaoundé, Cameroon

⁴Centre for Research in Infectious Diseases (CRID), P.O. Box 13501, Yaoundé, Cameroon

*Corresponding author: Djova SV, Department of Biochemistry, University of Bamenda, PO Box 39 Bambili, NW Region-Cameroon, Tel: +237 674399974; Email: djova.stevevaldi@yahoo.fr

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Abstract

Recently published article shows that the aqueous extract of *Ochna schweinfurthiana* was evaluated for the genotoxic and cytotoxic properties. Basic methodology was used in this work. Indeed, efficient methods need to be performed before concluding on the non-genotoxic and non-cytotoxic properties of this extract. Hence, this work aims to propose a methodological perspective to have the right conclusion about the genotoxicity and cytotoxicity of aqueous extract of *Ochna schweinfurthiana*. High technical methods like clastogenesis, mitotic index, replication index and micronucleus are used to evaluate the genotoxicity and cytotoxicity of the plant extract respectively. The right conclusion of the non-genotoxicity and non-cytotoxicity of the aqueous extract of *Ochna schweinfurthiana* may be verified by the implementation of this methodological perspective.

Keywords: Aqueous Extract, *Ochna schweinfurthiana*, Genotoxicity, Cytotoxicity, Methodological Perspective

Introduction

Ochna schweinfurthiana F. Hoffm is a traditional plant medicine used by the population of North Cameroon to treat different metabolic and infectious diseases [1]. Previous reports have evidenced its anti-microbial, antioxidant and anti-inflammatory activities [1]. The phytochemical study showed that it is a rich source of complex dimers of flavonoids [2]. A Recent work has demonstrated the non-genotoxicity and the non-cytotoxicity of the aqueous extract of *Ochna schweinfurthiana* using the *Salmonella thyphimurium* TA 98 and TA 100 tester strains as described by Maron and Ames [3] and the MTT reduction assay as described by Mosmann [4] using Vero cell lines. The concern highlighted here is to ensure whether this plant extract is devoid of mutagenic and cytotoxic effect. So, can we say that this extract is innocuous on the Human gene and no side effect on the normal cell?

However, to provide a clear answer to the above-mentioned question, it will be necessary to beyond described a method different from these used in the previously published article by Djova et al. (2019) in Evidence-Based Complementary and alternative Medicine Journal under the title Phytochemical study of aqueous extract of *Ochna schweinfurthiana* F. Hoffm powder bark and evaluation of their anti-inflammatory, cytotoxic, and genotoxic properties. In this work, we are going to propose a methodological perspective that can contribute to draw a right conclusion about the genotoxic and cytotoxic properties of aqueous extract of *Ochna schweinfurthiana* F. Hoffm.

Methodological Perspective to Evaluate Genotoxic and Cytotoxic Properties of Aqueous Extract of *Ochna schweinfurthiana*

Genotoxicity Evaluation

Many researchers argued that natural medicines are much safe than synthetic drugs [5]. But in most countries, there is no universal regulatory system, to control the safety of natural products and they had not been sufficiently investigated toxicologically [6]. To determine the genotoxicity of plant extracts, various experimental systems exist [5]. Basic method was used by Djova et al. (2019) to demonstrated the non-genotoxic prop-

erty of aqueous extract of *Ochna schweinfurthiana*. However, this method is not sufficient to conclude about the safety of the plant extract [5] reported that single test system is not sufficient to come to the conclusion that plant extract or particular agent is mutagenic or not. Hence, to have a right potential genotoxic property of aqueous extract of *Ochna schweinfurthiana*, Ames test described by Djova et al. (2019) using *Salmonella thyphimurium* test Ta 98 and Ta 100 could be associated to a clastogenesis test. Clastogenesis test described the ability of compound or plant extract to induce alterations in chromosome aberrations. Chromosome aberrations are extremely valuable and highly relevant for the detection of potential carcinogens and mutagens [7].

Cytotoxicity Evaluation

As it is the case with genotoxicity test, generally single test system is not sufficient to come to the conclusion that plant extract or particular agent is cytotoxic or not. The MTT reduction assay was used by Djova et al. (2019) to demonstrated the non-cytotoxicity of the aqueous extract of *Ochna schweinfurthiana*. Despite the above limitation, cell-culture models have a number of advantages over other experimental systems, including avoidance of ethical issues related to animal or human studies, ability to cryopreserve cell lines, ability to conduct mechanistic studies at molecular level, ease of control of the experimental environment and cost [6]. However, cell-culture systems cannot replicate conditions found in the body, e.g. systemic functions such as the nervous and endocrine systems are missing. Thus, control of cellular metabolism may be more constant *in vitro* and the cultured cells will not be fully representative of the tissue from which they derived. Provided the limits of the model are appreciated, cell culture is a valuable, if not the most valuable tool in biomedical science [8].

High *in vitro* and *in vivo* test are used to evaluate the cytotoxicity of plant extracts such as mitotic index (MI), replication index (RI) and micronucleus (MN) analysis methods. MI measures the proportion of cells in the M-phase of the cell cycle and its inhibition could be considered as cellular death or delay in the cell proliferation kinetics [9]. RI measures cell division kinetics by counting the percent of cells in first, second, third or more metaphase [10].

Conclusion

A previous work published by Djova *et al.* (2019) has demonstrated that aqueous extracts of *Ochna schweinfurthiana* evaluated have a non-genotoxicity potential and non-cytotoxicity property using respectively Ames method and MTT method. Such efficient methods are needed to be performed before arriving at conclusions regarding the safety of aqueous extract of *Ochna schweinfurthiana* F. Hoffm.

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